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MEMORANDUM

To:	File
From:	Eron Dodak, David Livermore, Integral Consulting Inc.; Rob Webb, Dalton, Olmsted & Fuglevand, Inc.
Date:	March 8, 2022
Subject:	City of Portland Pressure Sewer Main Location and Revised Core Location Buffer
Project No.:	CF167

This memorandum summarizes work completed to identify the location of the City of Portland's (City) pressure sewer main located in the area immediately upstream of the BNSF railroad bridge near River Mile (RM) 6.9 of the Willamette River in Portland Harbor and a proposed revised "no coring buffer area" to be considered for the Arkema Pre-Design Investigation (PDI) work in Sediment Management Area (SMA) RM7WA. This work has been completed by Integral Consulting Inc. (Integral) and Dalton, Olmsted & Fuglevand, Inc. (DOF) with field surveying by David Evans and Associates (DEA) on behalf of Retia Inc. (Retia), agent for Arkema.

BACKGROUND

In April 2021, Integral submitted an application to the Oregon Department of State Lands (ODSL) for a permit to conduct coring and other investigation work in the Willamette River in SMA RM7Wa. In September 2021, Integral received a response from ODSL indicating that the permit could not be approved without better delineation of the City-owned pressure sewer main that crosses the river through the downstream portion of the SMA relative to proposed core locations that are an element of the U.S. Environmental Protection Agency (EPA)-approved PDI work plan. After some discussions with the City in fall 2021, it was determined that the City did not have information (i.e., a map with a precise location, survey coordinates of the pipeline) accurate enough to depict the pressure sewer main relative to investigation cores. The pressure sewer main is buried in the sediment at an unknown depth(s). At that time, Retia conducted further investigation of the pressure

sewer main using geophysical and bathymetric survey techniques. This memorandum summarizes the results of that work, identifies the area where the pressure sewer main is located, and provides a proposed buffer area for coring work such that the PDI can be completed in accordance with EPA requirements.

WORK COMPLETED

In October/November 2021, DOF contracted with DEA to conduct various non-invasive surveys in an effort to survey the location of the pressure sewer main. Several geophysical and bathymetric survey methods were used. A summary of the methods used and their efficacy at identifying or imaging the pressure sewer main are summarized below:

- **Side-scan sonar**—The side-scan sonar image of the site produced a very sharp image and identified exposed pipelines and outfalls at or near the sediment surface very well, but did not identify the City's buried pressure sewer main.
- **Parametric sub-bottom profiler**—The parametric sub-bottom profiler did not produce unambiguous hyperbolic targets typically associated with passing over a cylindrical object (i.e., sewer pipe). However, the sub-bottom data show anomalous areas that correlate closely with the easement boundaries and may represent the trench zone associated with the pressure sewer main installation.
- **Magnetometer**—The magnetometer produced readings of the Earth's total magnetic field that showed deflections, which are believed to be associated with the pressure sewer main, and other pipes, cables, and ferrous debris that may be present in the survey area. Several linear magnetic anomalies were identified, including one anomaly that correlated with an exposed pipe on the beach at the northern (downgradient) edge of the SMA. This magnetic anomaly also correlates well with the side scan-sonar pass in this area. Other linear trends of the magnetic anomalies fall within, or close to, the sewer line easement, but the signals were varied and broad enough that making a direct correlation is difficult. A second iteration of magnetometer passes was conducted with the instrument closer to the sediment surface. This iteration produced narrower, more distinct magnetic signatures over the sewer lines. Also, the search area was extended to the entire width of the river to try to establish a strong pattern of magnetic anomalies that conformed with the general understanding of where the pressure sewer main was located, thereby strengthening the confidence in the interpretation of the magnetic anomaly map. This second iteration provided the clearest images of magnetic anomalies that are likely associated with the pressure sewer main.

Figure 1a depicts features identified by the side-scan sonar and magnetometer surveys in the downstream portion of SMA RM7Wa. The side-scan sonar identified various known features including the rock cover for Outfall 004, a piling field along the shoreline, and various other objects in the RM7Wa. The magnetometer also identified various objects including the likely pressure sewer main, where it bends and crosses the channel, and other metallic objects in the area. The magnetometer survey could not be conducted shoreward of the -2 ft Columbia River Datum contour line because of lack of ability to deploy the instrumentation in shallow water areas.

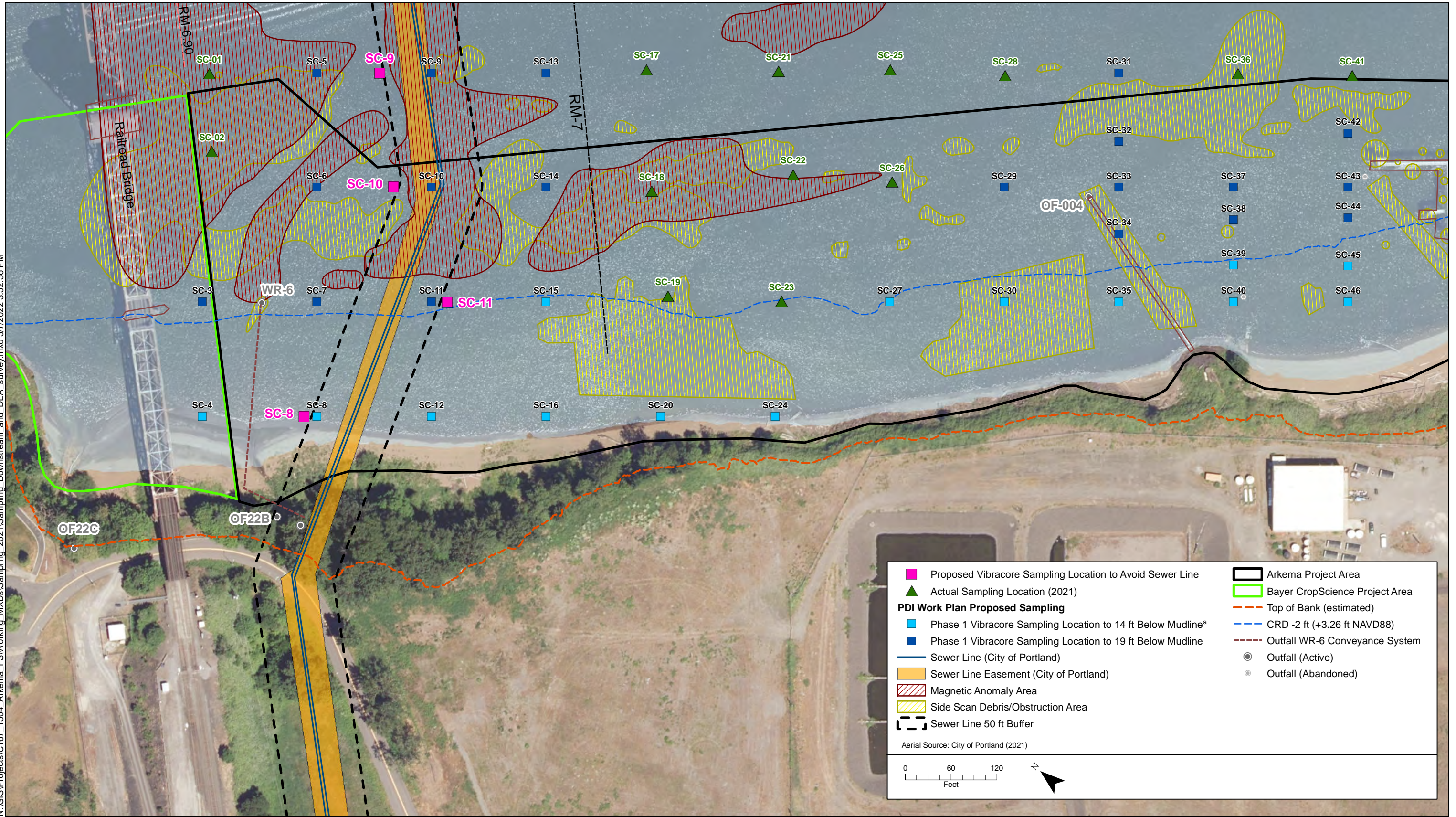
Figure 1b is a close-up of the downstream portion of the investigation area showing both magnetic anomalies and side-scan area identified “obstructions.” Figure 1b also shows the location of the pressure sewer main based on maps provided by the City. In addition, surveyed points on the pressure sewer main where it was located in the upland and beach areas are shown on this figure. Note that the upland survey points align closely with the pressure sewer main shown in green. Based on this analysis, the location of the pressure sewer main has been adequately identified to continue investigation in SMA RM7Wa, subject to a buffer area as proposed in the following section.

SUMMARY AND PROPOSED “NO CORING BUFFER AREA”

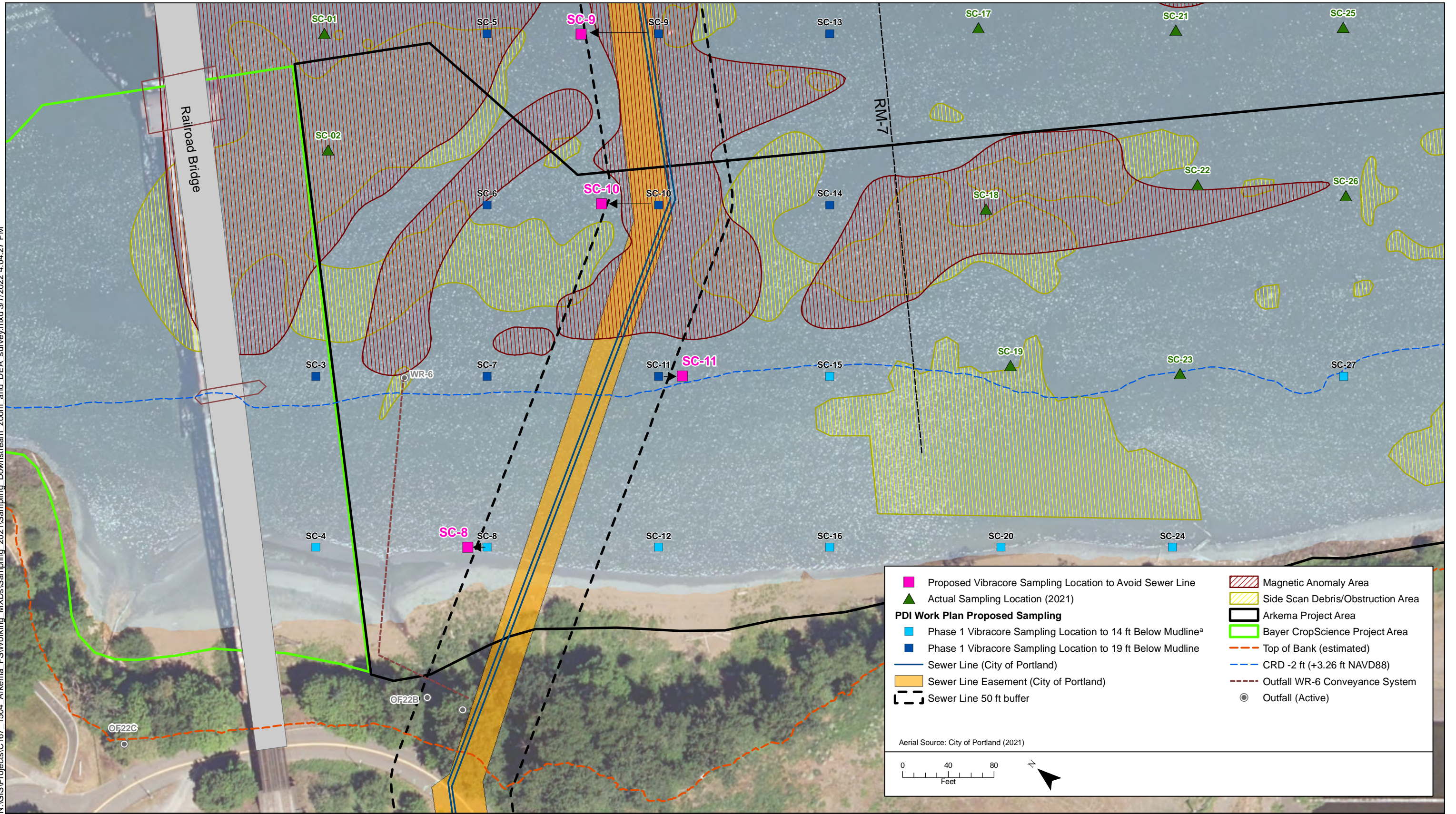
Various geophysical and bathymetric survey methods were utilized to identify the location of the City pressure sewer in the area of RM7Wa. The location of the pressure sewer main is shown on Figures 1a and 1b.

Based on the precision of the magnetometer data, Integral and DOF are proposing a 100-ft corridor (50 ft on either side of the mapped sewer line) as a no coring buffer area for use in completing the PDI in this portion of SMA RM7Wa. Figures 1a and 1b show the buffer area and the EPA-approved proposed core locations within the buffer area (blue squares). Specifically, the original proposed locations for SC-8, SC-9, SC-10, and SC-11 fall within the no coring buffer area. Integral and DOF propose moving the locations of each of these cores to immediately outside the buffer area as shown as pink squares on Figure 1b. No other core locations would be affected by the proposed buffer. This buffer would apply to any future subsurface (i.e., greater than 1 ft below mudline) work proposed in subsequent phases of investigation or remediation. Adequate and appropriate buffers will need to be similarly developed for any future sediment remediation work within the vicinity of the pressure sewer main.

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Notes:

1. The magnetic survey was conducted riverward of the +2 ft CRD line.
The magnetic anomalies away from the sewer lines are unrelated to the sewer line.
2. ^a The vibracore equipment used to collect 19 ft cores requires a minimum 12 ft water depth. In shallower water near the shoreline, 14 ft cores are proposed.
3. City of Portland sewer line alignment and easement are sourced from the City BES Collection System GIS map layers at:
<https://gis-pdx.opendata.arcgis.com/datasets/PDX::collection-system-lines/about>

Figure 1b.

Close-up view of the Proposed Remedial Design Investigation Sediment Sampling Stations Downstream of Dock 2 and the 2021 DEA Magnetic Anomaly and Side Scan Debris/Obstruction Area Survey